MEASURED FIELD INTENSITY
WUSA, CHANNEL 9, WASHINGTON, DC

Location Number	Address	Field Intensity				
		Maximum (dBu)	Minimum (dBu	Median (dBu)	Standard Deviation (dB)	Adjusted* (dBu)
306	404 West Beech Road	72.1	51.9	63.9	3.0	60.9
606	4200 Wisconsin Avenue, NW	115.4	108.8	112.6	1.0	111.6
681	9224 Sanderpark Road	69.3	64.4	69.0	0.7	68.3
981	716 Catoctin Circle, NE	77.9	68.3	74.0	1.5	72.5
1056	2207 Observatory Place, NW	87.8	43.7	73.5	7.6	65.9**
1131	9614 Inverary Court	77.9	68.2	74.2	1.5	72.7
1206	11606 Handboard Road	57.4	50.7	54.8	1.8	53.0
1356	15510 Hughes Road	77.9	56.5	74.9	3.8	71.1**
1431	21074 Hawthorne Court	76.2	62.6	70.7	2.7	68.0
1506	2905 Madison Place	102.9	96.0	99.5	1.2	98.3
1581	6125 Tuckerman Lane	98.3	74.3	92.1	4.3	87.8
1656	11028 Wood Elves Way	61.6	28.6	53.1	5.2	47.9**
1731	3129 Adams Mill Road, NW	98.7	67.0	87.1	6.8	80.3**
1881	4604 Wilwyn Way	91.7	66.8	86.1	5.4	80.7**
2031	1714 Burnham Road	73.3	65.9	72.1	1.0	71.1
2106	109 Follin Lane, SE	81.9	66.5	76.7	3.6	73.1
2181	2660 Dakota Street	80.5	64.6	76.8	2.3	74.5
2256	1515 November Circle	94.7	86.5	92.7	1.2	91.5**
2331	56 Garner Avenue	78.6	61.6	73.5	2.6	70.9
2481	4714 Reservoir Road, NW	91.5	50.6	81.2	6.6	74.6**
2556	8 Wagners Lane	79.5	70.2	74.7	0.6	74.1
2631	2540 Lander Road, Apt. C	72.6	36.2	62.9	5.9	57.0
2781	14V Laurel Hill Road	92.0	82.7	89.5	1.8	87.7
2856	2051 Pilgrim Drive	83.4	66.5	78.5	3.1	75.4
2931	9021 Copperleaf Lane	85.3	72.4	80.4	2.5	77.9
3306	4200 Wisconsin Ave., NW	115.4	108.8	112.6	1.0	111.6

* Median minus Standard Deviation
** Measured at 12 feet above ground

MEASURED FIELD INTENSITY
WUSA, CHANNEL 9, WASHINGTON, DC

Location Number	Address	Field Intensity				
		Maximum (dBu)	Minimum (dBu	Median (dBu)	Standard Deviation (dB)	Adjusted* (dBu)
3381	6217 Gentle Lane	90.3	79.1	88.0	2.0	86.0
3456	622 Tampa Road	68.2	57.4	65.6	1.7	63.9
3606	21 Mississippi Avenue, SE	89.2	55.3	77.9	5.2	72.7
3831	1911 Rhode Island Avenue	95.8	78.1	88.5	3.6	84.8
3981	672 Old Mill Road Bldg 309A	64.3	51.4	56.8	2.4	54.4
4056	120 Magnolia Road	66.7	49.9	59.7	2.8	56.9
4206	192 Irene Avenue	57.6	18.7	48.4	7.3	41.1
4356	13600 British Manor Court	73.6	47.1	67.5	3.7	63.7
4431	5007 Woodland Way	88.0	80.6	85.5	1.3	84.2
4506	14825 Black Ankle Road	95.6	64.8	66.7	2.5	64.2
4581	9907 Chase Hill Court	83.9	76.2	80.6	1.4	79.2
4656	S 7 672 Old Mill Rd., Apt. 309	64.3	51.4	56.8	2.4	54.4
4731	3310 Decatur Avenue	85.6	52.9	77.0	5.8	71.2**
4881	205 Bookham Lane	87.8	80.3	85.2	1.2	84.0
4956	6437 Prestwick Drive	75.4	57.6	71.6	4.3	67.3**
5181	7529 Greenbelt Rd. 550 C-6	102.9	67.0	92.4	5.8	86.5
5256	3006 Marcando Lane	82.0	74.9	80.2	1.4	78.8
5406	4200 Wisconsin Avenue, NW	115.4	108.8	112.6	1.0	111.6
5481	4200 Wisconsin Avenue, NW	115.4	108.8	112.6	1.0	111.6
5706	4200 Wisconsin Ave. NW 10685	115.4	108.8	112.6	1.0	111.6
5856	13301 Dover Road	48.1	31.9	41.3	3.1	38.3
5931	11945 Goya Drive	98.4	90.1	95.7	1.4	94.3
6006	923 7th Street, NE	83.0	39.7	66.8	8.0	58.8**
6081	4903 Edgemoor Lane 415	105.7	86.4	99.7	4.0	95.7**
6306	9059 Goods Dam Road	74.1	66.2	68.0	1.0	67.0

* Median minus Standard Deviation
** Measured at 12 feet above ground

MEASURED FIELD INTENSITY
WUSA, CHANNEL 9, WASHINGTON, DC

Location Number	Address	Field Intensity				
		Maximum (dBu)	Minimum (dBu	Median (dBu)	Standard Deviation (dB)	Adjusted* (dBu)
6456	3622 16th Street South	83.6	63.5	75.7	4.5	71.2
6531	7003 Elm Avenue	67.2	31.7	60.0	3.9	56.1**
6606	11610 Prince Albert Terrace	87.8	70.2	82.9	4.2	78.7
6681	1718 P Street, NW 914	94.0	47.0	78.3	6.3	72.0
6756	5 Fork Spring Court	67.9	50.2	63.2	2.8	60.4
6831	4200 Wisconsin Ave., NW 106	115.4	108.8	112.6	1.0	111.6
6906	5511 Heston Court	81.0	61.5	76.4	5.1	71.3
7131	3499 Firestone Drive	71.4	65.2	69.4	0.8	68.6
7431	4618A Indian Head Highway	99.5	56.4	78.8	4.5	74.3
7506	12402 Lime Kiln Road	80.3	72.0	77.4	0.8	76.6
7581	7947 Apples Church Road	90.7	59.8	64.3	1.4	62.9
7656	221 Whitmoor Terrace	83.2	47.7	73.6	5.8	67.9**
7806	4417 Wakefield Chapel Road	81.9	47.0	74.6	5.8	68.9
7881	5237 King Charles Way	107.4	101.2	105.7	0.9	104.8
KYW, CHANNEL 3, PHILADELPHIA, PENNSYLVANIA						
3906	177 Good Hope Road	63.1	40.3	60.1	2.4	57.6
2706	247 Johnstown Road	62.9	43.1	61.0	2.0	59.0
3231	404 East Thomas Avenue #B	59.7	56.0	55.5	3.4	52.1
831	377 Thomas Landing Road	65.3	46.3	63.4	1.9	61.5
5631	186 Wheatley Farm Drive	63.7	59.3	60.0	1.8	58.2
WBOC, CHANNEL 16, SALISBURY, MARYLAND						
231	6888 Travelers Rest Circle	63.6	51.0	55.3	3.1	52.2
2406	27650 Wakefield Lane	79.2	64.7	74.0	2.1	71.9
3081	29292 Dogwood View Road	72.1	66.2	69.7	0.8	68.9
5106	21710 Everlea Drive	91.0	74.0	83.4	2.2	81.2
6981	12649 Richland Lane	76.7	67.7	72.8	1.3	71.5

* Median minus Standard Deviation

** Measurement at 12 feet above ground

MEASURED FIELD INTENSITY
WHP, CHANNEL 21, HARRISBURG, PENNSYLVANIA

Location Number	Address	Field Intensity				
		Maximum (dBu)	Minimum (dBu	Median (dBu)	Standard Deviation (dB)	Adjusted* (dBu)
81	55B Gablers Road	75.1	22.8	34.2	9.5	24.6
531	950 West Spring Valley Road	76.3	59.2	71.6	3.2	68.5
906	17 Main Street West	61.3	25.1	49.8	5.5	44.3
1956	90 Finks Drive	74.9	28.9	64.2	6.5	57.8
3531	619 Lincoln Street	81.7	42.1	69.4	6.9	62.5
3756	828 Cranberry Road	78.9	65.9	73.1	1.8	71.3
4281	1975 Pickering Trail	85.7	37.8	58.3	9.7	48.6
4806	204 Main Street	92.7	83.8	89.7	1.4	88.3
5331	1014 Hain Road	86.4	31.3	47.0	9.5	37.5
6156	20 Charles Road	84.8	77.7	81.9	1.3	80.6
6381	443 Fremont Street	81.2	26.1	49.4	5.7	43.7
7206	12402 Lime Kiln Road	74.4	31.0	67.9	6.0	61.9

* Median minus Standard Deviation

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA

CBS Broadcasting Inc., et al.,	)	
	)	
Plaintiffs,	)	
	)	CIV-Nesbitt No. 96-3650
v.	)	Magistrate Judge Johnson
	)	
PrimeTime 24 Joint Venture,	)	
	)	
Defendant.	)	
	)	

Supplemental Expert Report of Jules Cohen, P.E.

1. This is a supplemental report submitted in compliance with Rule 26(a)(2) of the Federal Rules of Civil Procedure. I am an expert witness currently retained by plaintiffs. I may be asked to testify at trial pursuant to Rules 702, 703, or 705 of the Federal Rules of Evidence. My qualifications are set forth in my original Expert Witness Report, dated April 15, 1998.

Summary

2. In my original report, I described two projects -- creation of maps using Longley-Rice propagation data, and measurement of signal intensity at the homes of randomly selected PrimeTime 24 subscribers -- designed to determine whether PrimeTime 24's subscribers are able to receive a signal of Grade B intensity from local CBS and Fox stations. In each case, the procedures followed were those specified by the Federal Communications Commission

("FCC"). First, the Longley-Rice maps were created in the same manner as the FCC has employed and specified for analyses of television service: using the Longley-Rice Version 1.2.2 computer program developed by the United States Government, and applying Longley-Rice in the same way the FCC applies it. Second, the signal intensity tests were conducted using the procedures specified by the FCC in 47 C.F.R. § 73.686.

3. Two engineers, Richard L. Biby and Robert D. Culver, have now submitted expert reports on behalf of PrimeTime 24.[1/] Neither Mr. Biby nor Mr. Culver asserts that all PrimeTime 24 subscribers, or even any specified percentage of PrimeTime 24 subscribers, cannot receive a signal of Grade B intensity from their local stations. In fact, the only empirical data presented by either of these engineers relates to certain site measurements at or near the locations of 27 PrimeTime 24 subscribers (out of PrimeTime 24's millions of subscribers nationwide) in Fresno, California and Missoula, Montana. Many of these site measurements are of no relevance whatsoever to the issue of whether the households could receive a signal of Grade B intensity with a conventional outdoor rooftop antenna, because the engineers were not trying to measure outdoor field intensity directly. In any event, PrimeTime 24's experts do not claim that these 27 locations were selected randomly or through some other fair selection procedure, and they plainly were not selected in any such manner. As a result, the data collected at these locations do not enable one to draw any conclusions about PrimeTime 24's

---

1/ See the "Expert Report of Richard L. Biby," dated April 15, 1998, and the "Expert Report of Robert D. Culver, P.E.," also dated April 15, 1998.

overall subscriber base even in Fresno and Missoula, much less nationally. And even at these chosen locations, the relevant data support my conclusions.[2/]

4. If the great majority of PrimeTime 24's subscribers were unable to receive a signal of Grade B intensity from their local stations -- as PrimeTime 24 apparently contends -- Mr. Biby and Mr. Culver could easily establish that fact. To do so, Mr. Biby or Mr. Culver could simply measure the signal intensity of local CBS and Fox stations, using the established FCC procedures, at or near the homes of a sufficiently large number of randomly selected PrimeTime 24 subscribers. Neither Mr. Biby nor Mr. Culver, however, present any such data.

5. Mr. Biby attacks my use of Longley-Rice maps to predict whether particular PrimeTime 24 subscribers receive a signal of Grade B intensity. Instead of following FCC procedures for creation of Longley-Rice maps, Mr. Biby contends that it is necessary to run Longley-Rice in an aberrational manner that grossly understates station coverage areas. As discussed below, there is no basis for this departure from the procedures specified by the FCC for running Longley-Rice.

6. Mr. Biby also attacks my use of the FCC signal intensity measurement procedures in 47 C.F.R. § 73.686 in measuring the signal intensity of CBS and Fox stations near the homes of PrimeTime 24 subscribers. As Judge Nesbitt's Order explains, however, "absent an industry agreement, the FCC's standard for measuring signal intensity is the most appropriate

---

[2/] Among other things, many of these 27 locations -- and virtually all of those predicted to receive a Grade B or better signal by Longley-Rice -- do in fact receive a signal of Grade B intensity or better from their local stations.

standard to utilize." Order at 26. PrimeTime 24's own experts themselves have relied on the FCC procedures, which they have characterized as "standard practices." See ¶ 34 below.

MR. BIBY'S REPORT

7. Mr. Biby does not present any empirical data whatsoever relating to the ability of PrimeTime 24 subscribers to receive signals of Grade B intensity from local CBS and Fox stations with a conventional outdoor rooftop antenna. Instead, Mr. Biby simply attacks the Longley-Rice maps and signal intensity testing data that I presented in my prior declarations in this action. Mr. Biby's attacks are without foundation.

Longley-Rice Maps

8. Normal employment of Longley-Rice program vs. use of Mr. Biby's special provisions. Mr. Biby does not dispute that the Longley-Rice maps that I have presented were prepared in accordance with the procedures specified by the FCC. See FCC OET Bulletin 69. He claims, however, that instead of using the Longley-Rice program in the manner generally employed by engineers and sanctioned by the FCC, I should employ adjustment factors, at least some of which appear to be unique to Mr. Biby's proprietary version of Longley-Rice computational software. Use of such factors would distort the maps, producing results that would not comport with actual field strength measurements. The Longley-Rice program that I have used, however, is the one that the FCC recently used in the important task of determining whether the assignments of digital television frequencies to television stations will replicate the coverage areas those stations currently enjoy in analog broadcasting. FCC, In re Advanced

Television Systems and Their Impact Upon the Existing Television Broadcast Service, MM Docket No. 87-268, FCC 98-24, 1998 WL 72379, at ¶ 180 (F.C.C.) (adopted Feb. 17, 1998); see Separate Statement of Reed Hundt, Chairman, FCC, In Re Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, MM Docket No. 87-268, 11 F.C.C. Rcd. 10968, 1996 WL 465110 (released Aug. 14, 1996) (referring to Longley-Rice data as "even more precise calculations"). In that proceeding, the FCC specifically rejected the use of proprietary software as a substitute for the Longley-Rice program available from U.S. Government sources. FCC 98-24, at ¶ 180.

9. Supposed failure to consider time and location variability. Mr. Biby claims that, in generating prior Longley-Rice maps, I failed to "consider location variability [and] time variability . . ." Biby Report at 6-8. That is incorrect. In generating Longley-Rice maps for the plaintiffs, I have expressly considered location and time variability and have used the factors endorsed by the FCC for analog stations -- namely, a 50% location factor and a 50% time factor. See FCC OET Bulletin 69. This means that 50% of the locations at the extreme outer edges of the resulting area would receive a signal of at least Grade B strength at least 50% of the time. Areas located closer to the transmitter have higher location-time factors. Among locations predicted to receive a Grade A signal, for example, more than 70% of locations are predicted to receive a signal of at least Grade B intensity at least 90% of the time.

10. I have arranged for the Longley-Rice maps submitted with my original expert report to be redone using a 50% location factor and a 90% time factor. (To test another criticism by Mr. Biby, I also changed the assumed antenna height to 20 feet.) These changes

made no material difference: the overwhelming majority of PrimeTime 24 subscribers are still predicted to receive a signal of at least Grade B (and often Grade A) intensity.[3/]

11. Mr. Biby's advocacy of a "97% / 97%" standard. Mr. Biby's criticisms of the Longley-Rice maps created under my direction are principally grounded in the following *non sequitur*: because PrimeTime 24's subscribers account for about 3% of television households, "it is appropriate" (according to Mr. Biby) "to consider the 97th percentage probability of reception, not the median (50th percentile) case." Biby Report at 7. In fact, Mr. Biby contends that it is necessary to apply both a 97% location factor and a 97% time factor.

12. Mr. Biby's contention is baffling. The use of location and time variability factors of 50/50 is a standard procedure specified by the FCC, and for obvious reasons: it enables one to determine which locations are more likely than not to receive a signal of Grade B intensity. In my career as an engineer since Longley-Rice was first developed three decades ago, I have never encountered the use of 97/97 factors for location and time.[4/]

[3/] As I explained in my original report, maps showing only one station at a time often greatly understate the percentage of PrimeTime 24 subscribers that are likely to be able to receive signals of Grade B intensity because the maps do not reflect the presence of other nearby stations of the same network. To illustrate for the Court the combined impact of the different network stations affiliated with a single network in a given region, I have supervised the creation of a map showing all of the CBS stations that propagate signals over North Carolina, South Carolina, or Virginia.

[4/] Engineers generally do not use extremely high location and time factors -- such as those proposed by Mr. Biby -- because they distort prediction results. Mr. Biby states that "it is generally accepted that both the location variability and the time variability of a broadcast signal have a log normal distribution." Biby Report at 6. While Mr. Biby's assertion is correct for variabilities between 10% and 90%, it is not true where the variability selected is either above 90

(continued...)

13. Mr. Biby's basis for using those factors is apparently his contention that PrimeTime 24's subscribers reside in "the worst 3% (or so) receiving locations." Biby Report at 11. (Mr. Biby also refers to the locations of PrimeTime 24 subscribers as "the difficult receiving locations being considered." *Ibid.*) In short, Mr. Biby has engaged in circular reasoning: he simply assumes that PrimeTime 24 subscribers are located in the worst locations in the United States for receiving television signals. Mr. Biby presents no data to support that conclusion, and it is plainly wrong.

14. The irrationality of crediting subscriber self-reporting about "unacceptable pictures." Although Mr. Biby does not explicitly say so, his basis for assuming that PrimeTime 24's subscribers reside in the 3% most difficult receiving locations is apparently the fact that PrimeTime 24 claims to provide service only to persons who say they receive unacceptable pictures with a conventional rooftop antenna. For many reasons, however, the fact that a subscriber is willing to make such a statement sheds no light on whether the subscriber's household is capable of receiving a signal of Grade B intensity with an outdoor rooftop antenna.

15. First, the signal strength testing conducted under my direction proves that the PrimeTime 24 sign up process does not remotely succeed in limiting its customers to "unserved households," as required under the SHVA. In Miami, for example, 100% of the 100

4/ (...continued)
(as with Mr. Biby's purported 97/97 factors) or below 10. At these extreme edges of variability, log normal distribution breaks down. For these and other reasons, Mr. Biby's calculations of the number of dBu needed to apply 97/97 factors are inaccurate -- even if a 97/97 approach were appropriate, which it is not.

randomly tested subscribers in Dade and Broward Counties received a signal of Grade B intensity -- even though all of them had (according to PrimeTime 24) stated that they did not receive an acceptable picture.

16. Second, as the maps submitted along with my April 15 expert report show, the overwhelming majority of PrimeTime 24's subscribers are located not in remote rural areas, but in urban and suburban areas in which the signals of local stations are strong. Indeed, PrimeTime 24 signs up subscribers whose addresses are only blocks away from the transmitting towers of local stations.

17. Third, even aside from these empirical data, there is no reason to expect that self-reporting by potential subscribers that they do not receive "acceptable pictures" would enable one to conclude that the subscribers cannot receive a signal of Grade B intensity with a conventional outdoor rooftop antenna. As one of PrimeTime 24's own experts, William Hassinger, has explained,[5/] asking an individual whether a particular television picture is acceptable is "a subjective question." Hassinger Tr. 74; see *ibid.* at 78. Since judgments about whether television pictures are "acceptable" are subjective, people "tend to differ" from one another in making those judgments. Hassinger Tr. 71-72; *ibid.* at 93 ("Individuals have a broad

---

5/ Mr. Hassinger submitted an expert report in this action in support of PrimeTime 24's opposition to plaintiffs' motion for a preliminary injunction. He also submitted a report on behalf of PrimeTime 24 to the Copyright Office, see Written Testimony of William H. Hassinger Before the Copyright Office of the Library of Congress, and gave oral testimony on PrimeTime 24's behalf at a Copyright Office hearing.

range of tastes for various image characteristics") (quoting Russell Neuman, another PrimeTime 24 expert).

18. Because "acceptability" is purely subjective, professional standards have long emphasized that the only way to obtain meaningful data about the "acceptability" of television pictures is to have multiple observers assess the pictures. Hassinger Tr. 95 ("I don't think a sample of one is appropriate"); Tr. 100 (expert treatise calls for 20 or more observers to evaluate picture quality); Tr. 105 (International Telecommunications Union calls for 15 observers to evaluate picture quality); Tr. 110 (Hassinger testifies that at least five observers are necessary to evaluate picture quality).

19. In addition to the need for multiple observers to overcome the inevitable subjectivity of "acceptability," Mr. Hassinger recognized (and I agree) that it is absolutely vital that the observers be unbiased. Homeowners who have decided that they would like to subscribe to PrimeTime 24 are obviously not unbiased observers. As PrimeTime 24's experts have acknowledged, no rational scientist would try to obtain meaningful data about whether television pictures are "acceptable" from observers who knew that they would get a benefit (here, additional TV channels) if they gave the "right answer." Hassinger Tr. 88-91; Neuman Hearing Testimony, Tr. 466 (6/3/97).

20. Even if potential subscribers were unbiased observers -- which they are not -- their observations about picture quality on their own television sets would not provide reliable data about whether they could receive a signal of Grade B intensity through use of a

conventional outdoor rooftop antenna. For one thing, many households do not use a rooftop antenna to receive television programming, instead relying either on cable television (to which about 2/3 of all U.S. television households subscribe) or on set-top "rabbit ear" antennas. A viewer who does not have a rooftop antenna can hardly be expected to provide meaningful information about whether an "acceptable" picture can be achieved through use of a rooftop antenna. In addition, even if a household has a rooftop antenna, the household's equipment setup may be defective, resulting in a degradation in picture quality compared to what one could obtain with properly functioning equipment. (See ¶ 64 below for some real life examples of this phenomenon among PrimeTime 24 subscribers.)

21. Finally, certain sources of television picture degradation (such as ghosting and interference) can occur in a signal that is above the threshold of Grade B intensity. In an area surrounded by mountains, for example, a certain degree of ghosting may occur at certain locations even if a strong signal is available at those locations. Although these effects can be minimized through readily available techniques, a viewer could label a television picture as "unacceptable" (in his or her subjective opinion) for reasons having nothing at all to do with signal intensity.

22. For all of these reasons, it is irrational to use viewer self-reporting about "acceptable pictures" as a guide for determining which households could receive a signal of Grade B intensity through use of a conventional outdoor rooftop antenna.[6/]

[6/] Based on my review of data I collected for use in another proceeding, if one uses a (continued...)

23. Interference. Mr. Biby complains that the Longley-Rice maps I have submitted "totally ignore the question of interference from other television stations." Biby Report at 10. Yet interference from other stations, as Mr. Biby effectively admits, is irrelevant to the determination of what signal strength a location receives from a particular station. See Biby Report at 10 ("station coverage is limited more by interference from other stations than by a lack of signal strength"). Because "Grade B intensity" is an objective measure of signal strength, interference from other stations has no bearing on whether a location receives a Grade B intensity signal. Furthermore, interference, if it is present at all, is likely to be at the outer fringes of a station's coverage. A properly oriented outdoor antenna would be expected to discriminate against interfering signals while enhancing the signal from the desired station.

24. Noise. Mr. Biby asserts that "many PrimeTime 24 subscribers reside in urban areas, which have significantly higher noise levels than . . . rural environments." Biby Report at 11. But manmade noise is irrelevant to whether a location receives a signal strength of Grade B intensity. The empirical data that have been gathered at my direction show that at the

---

9/ (...continued)
properly functioning and properly oriented rooftop antenna/transmission line/television setup and relies on multiple, neutral observers to provide evaluations, a Grade B intensity signal will usually, although not always, generate a television picture that the neutral observers would rate as acceptable. Because (a) PrimeTime 24 subscribers are not neutral (or multiple) observers and (b) there is no reason to believe that PrimeTime 24 subscribers have a properly functioning rooftop antenna/transmission line/television setup, there is no reason to expect the same relationship between signal intensity and estimates of picture quality to exist when picture quality assessments are made by PrimeTime 24 subscribers about their own television reception.

actual locations of randomly selected PrimeTime 24 subscribers -- urban or otherwise -- a Grade B intensity signal is indeed present in the air at the overwhelming majority of locations.

25. Buildings and vegetation. Mr. Biby criticizes me for supposedly not taking buildings and vegetation into account in creating Longley-Rice maps. Biby Report at 5. That criticism is unfounded. The Longley-Rice methodology I have used is the same Longley-Rice methodology the FCC has relied on in determining the service areas of television broadcast stations, and the same one that I use in my own engineering practice. I do not believe sufficiently accurate data exist about buildings and vegetation throughout a station's entire coverage area to be able to improve the accuracy of Longley-Rice by attempting to take such data into account.

26. In any event, the fact that the Longley-Rice program as used normally does not expressly take buildings and vegetation into account does not impair the usefulness of Longley-Rice predictions for the purposes of determining whether households are likely to receive a signal of Grade B intensity. Large concentrations of buildings are located in cities, and the transmitters of television stations are designed to provide signals of much greater than Grade B intensity in cities. In Miami, for example, the antenna farm for television stations WFOR and WSVN is located only about 13 miles from downtown Miami, and stations located in the antenna farm provide extremely strong signals in the core urban areas of Miami. Even if urban clutter resulted in some loss of signal strength, the signals are so strong that they remain far above the Grade B threshold.

27. A particular station's signal may sometimes encounter urban clutter towards the outer edge of its signal area. In those cases, however, a local television station will almost always be present and will provide a much stronger signal to local residents. For example, if the signals of Baltimore television stations were impeded by urban clutter in Washington, D.C., that problem would be academic for this purpose, since Washington, D.C. has its own network television stations that provide strong signals to people in urban areas in Washington, D.C. The same point can be made about several other markets among those for which I have submitted Longley-Rice maps, such as Colorado Springs (which is near Denver), Toledo (which is near Detroit), Milwaukee (which is near Chicago), and Columbus, Georgia (which is near Atlanta). As mentioned above, to give the Court a sense of the combined coverage of network stations in a given region, I have supervised the preparation of a map showing the Longley-Rice coverage areas for all of the CBS stations that propagate signals into the states of Virginia, North Carolina, and South Carolina. The map shows that virtually all heavily populated areas are predicted to receive Grade A signals from their local CBS stations.

28. Moreover, the site measurements that we have carried out show that the overwhelming majority of PrimeTime 24 subscribers are able to receive signals of Grade B intensity from their local stations. In Miami, for example, subscribers scattered through Miami's "urban" environment were measured to receive extremely strong signals from their local CBS and Fox stations. Neither Mr. Biby nor Mr. Culver has presented any contrary results from randomly tested households -- although they could easily do so if their theories were correct.

29. Supposed lack of empirical data supporting Longley-Rice. Mr. Biby contends that the performance of Longley-Rice "has never been verified under the operational conditions of residential rooftop reception of television broadcast signals." Biby Report at 9. Mr. Biby does not dispute, of course, that the FCC was sufficiently satisfied with Longley-Rice to use it in determining the actual coverage areas of analog television stations such as those at issue in this case. In any event, the signal intensity testing done under my direction for this case (and a parallel case against PrimeTime 24) shows that Longley-Rice performs well, and is vastly better as a predictor than the PrimeTime 24 method of asking viewers whether they get an acceptable picture.

30. To demonstrate this point, I have calculated the success rates of Longley-Rice -- and of the PrimeTime 24 "do you get an acceptable picture" approach -- in predicting the signal intensity results obtained in our field tests. I have credited Longley-Rice with a successful prediction under the following circumstances:

(a) correct prediction of Grade B signal: the household was predicted to receive a median signal of at least Grade B intensity from one or more stations of the relevant network, and was actually measured to receive a median signal of at least Grade B intensity from at least one of those stations;[7/]

7/ Because Longley-Rice predicts the median signal that is likely to be received at a particular location, I have used median data, rather than adjusted field strengths (median minus one standard deviation), for purposes of this analysis.

(b) correct prediction of no Grade B signal: the household was predicted not to receive a median signal of Grade B intensity from any station of the relevant network, and was measured to receive median signals of less than Grade B intensity from the relevant stations; and

(c) under-prediction: the household was predicted not to receive a median signal of Grade B intensity from any station of the relevant network, but was measured to receive at least a median Grade B signal. In this situation, Longley-Rice has under-predicted the signal strength at the household, thus making the household eligible in the first instance to receive an imported station by satellite. The under-prediction in Longley-Rice in these cases thus works to the disadvantage of the local station, not of PrimeTime 24.

31. I have credited the PrimeTime 24 "do you get an acceptable picture" method with a correct prediction if the household was measured to be unable to receive a median signal of Grade B intensity from any station of the relevant network.

32. Table 1 below sets forth the results of these calculations. The results are also shown in graphic form in Exhibit 1.

TABLE 1

TELEVISION MARKET AND STATION(S)	LONGLEY-RICE SUCCESS RATE	PRIMETIME 24 "ACCEPTABLE PICTURE" SUCCESS RATE
Miami (CBS, Fox) (Ch. 4, 7)	100%	0%
Charlotte (CBS) (Ch. 3)	99%	2%
Pittsburgh (Fox) (Ch. 53)	73%	36%
Baltimore (CBS) (Ch. 13)	94%	6%
Raleigh / Durham (ABC) (Ch. 11)	99%	1%

33. As Mr. Biby acknowledges, no prediction method is perfect. But the Longley-Rice program, run in the same manner as specified by the FCC, performs staggeringly better than the PrimeTime 24 system of self-reporting of subjective opinions about picture quality. (Because neither Longley-Rice nor any other prediction method provides absolute certainty, Longley-Rice predictions could be overridden by actual measurements if a carrier wished to perform them.)

Signal Intensity Measurements

34. Mr. Biby also attacks the procedures that I directed engineers to follow in measuring the signal intensity of CBS and Fox stations near the locations of PrimeTime 24

subscribers. The procedure I have used, however, is the standard method specified by the FCC in 47 C.F.R. § 73.686, and the same one followed by PrimeTime 24's experts in this very case.[8/] (I note that Judge Nesbitt has stated in her recent Order that "the FCC's standard for measuring signal intensity is the most appropriate standard to utilize." Order at 26.) The procedure I have followed is actually more conservative than that used by the FCC, because in analyzing the results I have subtracted one standard deviation from the median.

35. Mr. Biby attacks me for having engineers measure signal intensity at 30 feet. Biby Report at 11-12. Testing at 30 feet, however, is required under the FCC's procedures specified in 47 C.F.R. § 73.686, and is the procedure followed by PrimeTime 24's own engineers in this case.

36. The FCC has presumably chosen 30 feet as the appropriate height because that is a typical height for rooftop antennas. Mr. Biby implies, however, that "rooftop height" is significantly different than "30 feet in the air." Biby Report at 9. That is a puzzling assertion, since the data collected by Mr. Culver at homes hand-picked by PrimeTime 24 in Fresno (for those locations for which Mr. Culver provides antenna heights) report household antennas at

---

8/ See Declaration of W. Russell Neuman, ¶ 6 ("Cohen, Dippell and Everist employed the methods prescribed by the Federal Communications Commission at 47 C.F.R. § [73.]686 to measure field strengths"); W. Russell Neuman & Shawn O'Donnell, Broadcast Television Strength, Grade of Service and Picture Quality (Dec. 10, 1996) ("Cohen, Dippell and Everist employed standard practices, as defined by the Federal Communications Commission, to measure field strengths (see CFR 47 § 73.686 for details.") (emphasis added).

heights above ground of 25 feet, 28 feet, 30 feet, 35 feet, and 45 feet, for an average of 32.6 feet. See Fresno Field Observation Notes.[9/]

37. The difficulties that would be created by attempting to measure at the precise height of a household's actual rooftop antenna are many. For example, the PrimeTime 24 engineers in another case estimated a household's antenna height as 25 feet one day, and as 30 feet when they made a return trip a few days later. PrimeTime 24's engineer testified that "[a] discrepancy or difference of five feet is I would say about as good as anyone can estimate a height." Weller Tr. 34.

38. In any event, the differences between the signal intensity at 30 feet and at the slightly lower heights at which some households may have their antennas are likely to be small. To estimate the difference between signal strength at various heights, broadcast engineers often use a linear height/gain formula. (For example, Mr. Culver does so in his Expert Report at page 9.) The expected difference between 30 feet and 25 feet is only 1.6 dB; even at 15 feet (the lowest antenna height at any of the sites tested by PrimeTime 24 in Fresno and Missoula), the expected difference is only 6 dB. These small differences are immaterial in this context.[10/]

9/ I note that at several locations, Mr. Culver's engineers tested the ambient signal intensity on the street near the house or otherwise at a substantial distance from the house. See PTM 010014 ("in driveway ≈ 100 Ft North of Rd.≈ 500' S. of house"); PTM 010133-35, 010199, 010216, 010219, 010231, 010244-45, 010248-49 (photographs of subscriber households taken at a substantial distance from the house). Since Mr. Culver presents these as valid data with respect to the signal intensity at the household, there is no longer any dispute that testing on the street is an appropriate method to assess the signal intensity at a particular household.

10/ As discussed above, when I redid the Longley-Rice maps with a 50% location (continued...)

39. Mr. Biby also asserts that taking measurements at 30 feet will not reflect the effects of urban clutter. That is false. In a built-up urban area of the type Mr. Biby is describing, the effects of urban clutter would certainly be present at 30 feet. Indeed, it is difficult to imagine how urban clutter could exist if there are no buildings taller than 30 feet.

40. Mr. Biby's comment about urban clutter is inapt for a second reason as well. In an area of tall buildings, a "rooftop" antenna is likely to be much higher than 30 feet. In a multistory apartment building, for example, both a satellite dish and a rooftop antenna are likely to be located on the roof of the building, at a height far above 30 feet -- and with a correspondingly stronger over-the-air signal. Measuring at 30 feet, as I directed be done in accordance with standard FCC procedures, thus may understate the signal available at the actual rooftop height.

MR. CULVER'S REPORT

41. Unlike Mr. Biby, Mr. Culver attempted to perform actual field measurements of both signal intensity and picture quality, although only at a small number of locations. PrimeTime 24 apparently selected the markets in which to perform field tests -- Fresno and Missoula -- from among the five "plaintiff stations." (The other three stations are located in Miami, Indianapolis, and Jacksonville.) I note that the two markets PrimeTime 24 has

---

10/ (...continued)
factor and a 90% time factor, and changed the assumed antenna height to 20 feet, the results changed very little.

chosen have far more complex terrain features than the other three markets, as reflected by the Longley-Rice maps for those stations.

42. Mr. Culver's work is flawed both because he did not even purport to test a representative sample of subscribers, and because most of the data he collected is irrelevant to the question of whether the households can receive a signal of Grade B intensity. (The samples are also extremely small.) To the extent Mr. Culver gathered any relevant data, however, it strongly confirms my conclusions.

The Sample Tested by Mr. Culver is Biased and Unrepresentative

43. Mr. Culver provides no explanation for the selection of the 27 locations at which he performed tests. Although it would have been easy to select a random sample of households from among PrimeTime 24's subscribers, Mr. Culver has clearly not done that. Accordingly, there is no reason to believe that the locations tested by Mr. Culver are representative of the locations of PrimeTime 24 subscribers in Missoula and Fresno, much less in the United States as a whole. In fact, a comparison of the locations of the 27 selected subscribers with the overall characteristics of PrimeTime 24 subscribers in those markets shows that Mr. Culver's sample is highly biased.[11/] See Exhibit Nos. 2 and 3. For example:

-- Although 81% of PrimeTime 24's actual subscribers within KJEO's predicted FCC Grade B contour are predicted by Longley-Rice to receive a Grade B intensity

---

11/ Ten of the 27 selected subscribers, or 37%, are predicted by Longley-Rice to receive less than a Grade B intensity signal.

signal from KJEO, only half of the locations selected by PrimeTime 24 (7 out of 14) are predicted by Longley-Rice to receive a Grade B signal from KJEO.[12/]

-- As the map submitted with my original expert report shows, by far the largest clump of PrimeTime 24 subscribers in the Fresno area is concentrated in and near Fresno itself -- where Longley-Rice predicts unimpeded signal propagation. Yet out of the 14 households selected by PrimeTime 24, only one is in this large concentration of subscribers in an area expected to receive strong signals from KJEO. Notably, at that household (Location No. 1), Mr. Culver's engineers measured a signal far above Grade B intensity.

-- Although 44% of PrimeTime 24's subscribers within the FCC-predicted Grade B contour of KJEO are in Fresno County, only 21% (3 out of 14) of Mr. Culver's sample is in Fresno County.

-- 57% of the PrimeTime 24 testing sites are located in Mariposa and Madera Counties -- areas with significant terrain features that Longley-Rice shows to have many unserved areas -- even though those counties account for only 19% of overall PrimeTime 24 subscribers within KJEO's FCC-predicted Grade B contour.

-- With the exception of site No. 1, all KJEO locations are either at great distances from KJEO, in areas shown clearly to have less than Grade B field intensity as

---

12/ Subscriber counts are based on information regarding subscribers who signed up for PrimeTime 24 between July 1996 and November 1997.